We Claim:

1. Bis(2-acenyl)acetylene compounds of the formula:

$$\mathrm{Ac}-\!\equiv\!-\mathrm{Ac}$$

wherein each Ac group is independently selected from naphthalene, anthracene, or tetracene.

2. The compounds of claim 1 wherein each Ac group is tetracene.

3. The compounds of claim 1 wherein each Ac group is anthracene.

4. The compounds of claim 1 wherein each Ac group is napthalene.

5. The compounds of claim 1 wherein at least one of the terminal acene rings are substituted.

6. The compounds of claim 1 wherein both terminal acene rings are substituted.

7. The compounds of claim 6 selected from 6-substituted naphthalene rings, 6-substituted anthracene rings, or the 8-substituted tetracene rings.

8. The compounds of claim 5 where said substituents are selected from alkyl, alkoxy, thioalkoxy and halogen substituents.

9. The compounds of claim 1 wherein the terminal rings are unsubstituted.

10. A semiconductor device comprising at least one compound of claim 1.

11. The device of claim 10 wherein said device is an organic thin-film transistor.

12. The device of claim 10 wherein said device is an organic thin-film transistor comprising a surface treatment layer interposed between a gate dielectric and the semiconductor layer.

13. The device of claim 12 wherein said surface treatment layer is selected from a self-assembled monolayer, a nonfluorinated polymer layer or a siloxane polymer layer.

14. The device of 13 wherein the nonfluorinated polymer layer comprises a material selected from:

a) a polymeric layer derived from monomeric precursors, monomers, and oligomers comprising an aromatic-functional segment;

b) a polymeric layer derived from a ring-opening polymerization;

c) a polymeric layer comprising a polymer having interpolymerized units according to the formula:

$$\begin{array}{c} R^1 \\ | \\ -\!\!-C-\!\!-CH-\!\!- \\ |\quad\ | \\ R^2\ \ R^2 \end{array} \qquad (I)$$

in an amount from about 50 to 100% of said interpolymerized units; and from 0 to about 50% of said interpolymerized units according to the formula:

$$\begin{array}{c} X \\ | \\ -\!\!-C-\!\!-CH-\!\!- \\ |\quad\ | \\ R^2\ \ R^2 \end{array} \qquad (II)$$

wherein each R^1 and R^2 comprises, independently, a group selected from hydrogen; C_1-C_{20} aliphatic; chloro; bromo; carboxy; acyloxy; nitrile; amido; alkoxy; carboalkoxy; aryloxy; chlorinated aliphatic; brominated aliphatic; C_6-C_{20} aryl; C_7-C_{20} arylalkyl; hydroxy when different R_1 and X groups are included; and combinations thereof which may contain one or more heteroatom(s) and/or one or more functional group(s);

each X, independently, comprises a functional group capable of bonding to the gate dielectric; and

any combination of at least two R^1, R^2, and/or X groups may together form a cyclic or polycyclic aliphatic, aromatic, or polycyclic aromatic group; and

d) combinations thereof.

15. The device of claim 13 wherein said siloxane polymer layer comprises a polymer having interpolymerized units according to the formula:

$$-\underset{\displaystyle R}{\overset{\displaystyle R}{\overset{|}{\underset{|}{Si}}}}-O- \qquad (I)$$

wherein each R comprises, independently, a group selected from hydrogen, C_1-C_{20} aliphatic, C_4-C_{20} alicyclic, arylalkyl, or aryl, and a combination thereof which may contain one or more heteroatom(s) and/or one or more functional group(s).

16. The device of claim 15 wherein the polymeric layer comprises poly(dimethylsiloxane), poly(dimethylsiloxane-co-diphenylsiloxane), poly(methylphenylsiloxane-co-diphenylsiloxane), or poly(dimethylsiloxane-co-methylphenylsiloxane).

17. The device of claim 13 wherein said surface treatment layer comprises a self-assembled monolayer interposed between a gate dielectric and an organic semiconductor layer, the monolayer being a product of a reaction between the gate dielectric and a precursor to the self-assembled monolayer, the precursor comprising a composition having the formula:

$$X\text{--}Y\text{--}Z_n,$$

wherein X is H or CH_3;

Y is a linear or branched C_5 -C_{50} aliphatic or cyclic aliphatic connecting group, or a linear or branched C_8 -C_{50} group comprising an aromatic group and a C_3 -C_{44} aliphatic or cyclic aliphatic connecting group;

Z is selected from $-PO_3H_2$, $-OPO_3H_2$, benzotriazolyl ($-C_6H_4N_3$), carbonyloxybenzotriazole ($-OC(=O)C_6H_4N_3$), oxybenzotriazole ($-O-C_6H_4N_3$), aminobenzotriazole ($-NH-C_6H_4N_3$), -CONHOH, -COOH, -OH, -SH, -COSH, -COSeH, $-C_5H_4N$, -SeH, $-SO_3H$, -NC, $-SiCl(CH_3)_2$, $-SiCl_2CH_3$, amino, and phosphinyl;

and n is 1, 2, or 3 provided that n=1 when Z is $-SiCl(CH_3)_2$ or $-SiCl_2CH_3$.

18. The device of claim 17 wherein the monolayer precursor comprises a composition selected from $CH_3(CH_2)_mPO_3H_2$, wherein m is an integer from 4 to 21.

19. The device of claim 18 wherein the monolayer precursor comprises a composition selected from 1-phosphonohexane, 1- phosphonooctane, 1-phosphonohexadecane, and 1-phosphono-3,7,11,15- tetramethylhexadecane.

20. A method of making an organic thin film transistor comprising:

a) providing a substrate;

b) depositing a gate electrode material on the substrate;

c) depositing a gate dielectric on the gate electrode material;

d) depositing an organic semiconductor layer comprising said bis(2-acenyl)acetylene of claim 1 adjacent to the polymeric layer; and

e) providing a source electrode and a drain electrode contiguous to the organic semiconductor layer.

21. The method of claim 20, further comprising the step of providing a surface treatment layer interposed between a gate dielectric and an organic semiconductor layer.

22. The method of claim 21 wherein said surface treatment layer is selected from a self-assembled monolayer, a nonfluorinated polymer layer or a siloxane polymer layer.

23. The method of claim 20 wherein said layers are deposited by means of one or more aperture masks.

24. The method of claim 23 wherein said aperture masks are polymeric aperture masks.

25. The method of claim 23 wherein said aperture masks are repositionable.